

CLAIMS

1. A display system comprising:

a dimming device capable of switchably presenting a
5 light reflecting state or a light transmitting state; and

a display device for displaying information by
modulating light transmitted through the dimming device
and/or light reflected by the dimming device,

wherein the dimming device has a plurality of regions
10 each being independently capable of switchably presenting a
light reflecting state or a light transmitting state, and,
when a plurality of types of information are being displayed
on the display device, the dimming device is capable of
selectively switching between the light reflecting state or
15 the light transmitting state of each of the plurality of
regions in accordance with the types of information being
displayed.

2. The display system of claim 1, wherein the display device
20 supplies a display signal to a first display region for

performing display by modulating the light transmitted through the dimming device, and supplies a display signal to a second display region for performing display by modulating the light reflected by the dimming device, the display
5 signals being of different types.

3. The display system of claim 1 or 2, wherein,
the display device has a plurality of pixels; and
each of the plurality of regions of the dimming device
10 corresponds to each of the plurality of pixels in a one-to-one relationship.

4. The display system of any of claims 1 to 3, wherein,
the dimming device is a dimming device having a layered
15 structure including a first layer and a second layer, such that a light reflectance of the first layer changes in response to an external stimulation;

the first layer contains a first material whose optical characteristics change in accordance with a concentration of
20 a specific element; and

the second layer contains a second material capable of containing the specific element, the second material releasing or absorbing the specific element in accordance with the external stimulation.

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5. The display system of any of claims 1 to 3, wherein,

the dimming device is a dimming device comprising a dimming layer whose light reflectance changes in response to an external stimulation; and

10 the dimming layer contains a first material whose optical characteristics change in accordance with a concentration of a specific element, the first material being particles.

15 6. A display system comprising:

a dimming device capable of switchably presenting a light reflecting state or a light transmitting state; and

a display device for performing display by modulating incident light, wherein,

20 the dimming device is a dimming device having a layered

structure including a first layer and a second layer, such that a light reflectance of the first layer changes in response to an external stimulation;

the first layer contains a first material whose optical
5 characteristics change in accordance with a concentration of a specific element; and

the second layer contains a second material capable of containing the specific element, the second material releasing or absorbing the specific element in accordance
10 with the external stimulation.

7. The display system of claim 6, wherein the display device performs display by modulating light transmitted through the dimming device and/or light reflected by the dimming device.

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8. The display system of any of claims 4, 6, and 7, wherein the element is hydrogen, and the first material is able to transition between a light reflecting state and a light transmitting state in accordance with a hydrogen
20 concentration.

9. The display system of claim 8, wherein the second layer contains a hydrogen storage material.

5 10. The display system of claim 9 operating in a region where respective hydrogen equilibrium pressure-composition isotherms (PTC characteristic curves) of the first layer and the second layer are substantially flat.

10 11. The display system of claim 10, wherein, in the region where the PTC characteristic curves are substantially flat, hydrogen equilibrium pressures of the first layer and the second layer are about the same.

15 12. The display system of claim 11, wherein a range of hydrogen storage amount of the second layer in the region where the PTC characteristic curve is substantially flat encompasses a range of hydrogen storage amount of the first layer in the region where the PTC characteristic curve is
20 substantially flat.

13. The display system of any of claims 4 and 6 to 12,
wherein the second material releases or absorbs the specific
element through exchanges of electrons.

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14. The display system of any of claims 4 and 6 to 13,
wherein the second material releases or absorbs the specific
element in response to light irradiation.

10 15. The display system of claim 14, wherein the second layer
contains a material having a photocatalytic ability.

16. The display system of any of claims 4 and 6 to 15,
comprising a pair of conductive layers for forming an
15 electric field for causing ions of the specific element to
move from the second material to the first material, or from
the first material to the second material.

17. The display system of claim 16, wherein the first and
20 second layer are positioned between the pair of conductive

layers.

18. The display system of claim 16 or 17, wherein the first layer has conductivity, and functions as one of the pair of
5 conductive layers.

19. The display system of claim 16 or 17, wherein the second layer has conductivity, and functions as one of the pair of conductive layers.

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20. The display system of any of claims 4 and 6 to 19, wherein the second layer has a light transmitting ability.

21. The display system of any of claims 4 and 6 to 20,
15 wherein at least one of the first layer and the second layer has a multi-layer structure.

22. A display system comprising:

a dimming device capable of switchably presenting a
20 light reflecting state or a light transmitting state; and

a display device for performing display by modulating incident light, wherein,

the dimming device is a dimming device comprising a dimming layer whose light reflectance changes in response to
5 an external stimulation; and

the dimming layer contains a first material whose optical characteristics change in accordance with a concentration of a specific element, the first material being particles.

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23. The display system of claim 22, wherein the display device performs display by modulating light transmitted through the dimming device and/or light reflected by the dimming device.

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24. The display system of claim 5 or 22, wherein the first material is able to transition between a light reflecting state and a light transmitting state in accordance with the concentration of the specific element.

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25. The display system of claim 24, wherein the dimming layer
diffuse-reflects light when the first material is in the
light reflecting state.

5 26. The display system of any of claims 5 and 22 to 25,
wherein a diameter of the particles is equal to or greater
than 350 nm and equal to or less than a thickness of the
dimming layer.

10 27. The display system of any of claims 5 and 22 to 26,
wherein the specific element is hydrogen.

28. The display system of any of claims 5 and 22 to 27,
further comprising a conversion layer containing a second
15 material capable of containing the specific element, wherein
the second material releases or absorbs the specific element
in accordance with the external stimulation.

29. The display system of claim 28, wherein the specific
20 element is hydrogen, and the conversion layer contains a

hydrogen storage material.

30. The display system of claim 29 operating in a region where respective hydrogen equilibrium pressure-composition isotherms (PTC characteristic curves) of the dimming layer and the conversion layer are substantially flat.

31. The display system of claim 30, wherein, in the region where the PTC characteristic curves are substantially flat, hydrogen equilibrium pressures of the dimming layer and the conversion layer are about the same.

32. The display system of claim 31, wherein a range of hydrogen storage amount of the conversion layer in the region where the PTC characteristic curve is substantially flat encompasses a range of hydrogen storage amount of the dimming layer in the region where the PTC characteristic curve is substantially flat.

33. The display system of any of claims 5 and 22 to 32,

wherein the second material releases or absorbs the specific element through exchanges of electrons.

34. The display system of any of claims 5 and 22 to 32,
5 wherein the second material releases or absorbs the specific element through an electrochemical reaction.

35. The display system of any of claims 5 and 22 to 34,
comprising a pair of conductive layers for forming an
10 electric field for causing ions of the specific element to move from the second material to the first material, or from the first material to the second material.

36. The display system of claim 35, wherein the dimming layer
15 and the conversion layer are positioned between the pair of conductive layers.

37. The display system of claim 35 or 36, wherein the dimming layer has conductivity, and functions as one of the pair of
20 conductive layers.

38. The display system of claim 35 or 36, wherein the conversion layer has conductivity, and functions as one of the pair of conductive layers.

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39. The display system of any of claims 5 and 22 to 38, wherein the conversion layer has a light transmitting ability.

10 40. The display system of any of claims 5 and 22 to 39, wherein at least one of the dimming layer and the conversion layer has a multi-layer structure.

41. The display system of any of claims 1 to 40, wherein the
15 display device is a liquid crystal display device including a pair of substrates and a liquid crystal layer provided between the pair of substrates.

42. The display system of any of claims 1 to 41, further
20 comprising an illumination device disposed on an opposite

side from a viewer with respect to the display device.

43. The display system of claim 42, wherein the dimming
device is disposed between the display device and the
5 illumination device.

44. The display system of any of claims 1 to 42, wherein the
dimming device is disposed inside the display device.

10 45. The display system of any of claims 1 to 44, wherein the
display device includes a first color filter.

46. The display system of any of claims 1 to 45, wherein the
dimming device includes a second color filter.

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47. The display system of any of claims 4 and 6 to 21,
wherein the display device includes a first color filter; the
dimming device includes a second color filter; and the second
color filter is disposed on an opposite side from a viewer
20 with respect to the first layer.

48. The display system of any of claims 5 and 22 to 39,
wherein the display device includes a first color filter; the
dimming device includes a second color filter; and the second
5 color filter is disposed on an opposite side from a viewer
with respect to the dimming layer.